Direct and indirect oil shocks and their impacts upon energy related stocks

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A R T I C L E   I N F O

A B S T R A C T

We attempt to consolidate (at least in part) the vast literature on oil shocks and stock returns by decomposing the influence of oil shocks into two channels of effect: 'direct' and 'indirect'. Using a simple empirical asset pricing model, it is shown that oil shocks can affect stocks not only directly, but also indirectly through general market risk (which is shown to be due in part to oil shocks), or put another way that additional oil price risk exposure is embedded in the traditional market beta. As far as is known this is the first paper explicitly quantifying both effects together. By doing so we offer a more complete picture of when and how oil shocks impact stock returns, thus allowing investors to make more informed responses to oil shocks. The results are illustrated using daily data from all (active) listed energy related stock portfolios in the Asia Pacific Region, and are robust to structural instability and the specification of oil shock used.

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1. Introduction

There already exists an extensive and high-profile literature demonstrating that oil shocks can affect stock market behavior. The accumulated wisdom of previous research points toward two distinct ways in which oil shocks can influence stock returns. For a single stock (or sub-index

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portfolio), the first channel of influence that might be considered is a 'direct' response to oil shocks. For example, Huang et al. (1996), Faff and Brailsford (1999), Sadorsky (2001), Hammoudeh and Li (2004), El-Sharif et al. (2005) and Boyer and Filion (2007) all investigate how oil price shocks affect industry specific returns, reporting what we refer to here as a 'direct' effect. The empirical nature of the direct effect is highly variable. These previous studies demonstrate that some industries are not immediately affected by changing oil prices, whereas others are. Sensible justifications for these differences are easy enough to posit: supply chain issues become much more relevant when considering the individual stock (portfolio) insofar as oil price exposure depends on the exposure of the full supply chain to oil prices. If any stage is exposed, then some sensitivity to oil shocks should be seen, since they pass directly through operational costs. Huang et al. (1996) for example show that crude oil futures impact oil company stock returns, but do not affect some other industries. Gogineni (2010) reinforces this assertion by explicitly considering the energy consumption structure of industries. When industries are classified into oil-intensive and non-oil intensive groups the influence of daily oil price shocks on stock returns varies. Some further studies considering individual industry sectors or sub-indexes include those by Scholtens and Yurtsever (2012), Arouri (2012), Broadstock et al. (2012), Narayan and Sharma (2011), Arouri (2011), Elyasiani et al. (2011), Mohanty et al. (2011), Arouri and Nguyen (2010), Kilian and Park (2009), Nandha and Faff (2008), Boyer and Filion (2007), El-Sharif et al. (2005) and Hammoudeh and Li (2005). The general consensus from these studies is that the Oil and Gas sector, and also the Mining sector, tends to be positively affected by rising oil prices, whereas the reverse holds true for other sectors.

A second channel of effect highlighted by existing research is that from oil shocks to the wider stock market as a whole. Broadly speaking, existing studies suggest a negative relationship between oil shocks and the performance/returns of whole stock markets (see, inter alia, Filis and Chatziantoniou, 2013; Ciner, 2012; Lee and Chiou, 2011; Filis, 2010; Chen, 2010; Miller and Ratti, 2009; Driesprong et al., 2008; Nandha and Faff, 2008; O'Neill et al., 2008; Park and Ratti, 2008; Bachmeier, 2008; Henriques and Sadorsky, 2008; Sadorsky, 2001; Papapetrou, 2001; Ciner, 2001; Gjerde and Saettem, 1999; Huang et al., 1996; Jones and Kaul, 1996). Maintaining focus on the single stock (portfolio), we argue that this second channel represents an 'indirect' effect whereby the influence upon the whole market is subsequently embedded into the value of the individual stock (portfolio). To motivate the 'indirect' influence of oil, and notwithstanding the empirical support from previous papers as listed above, it is useful to recognize some of the core asset pricing literature. The widely used Capital Asset Pricing Model (CAPM) originally proposed by Sharpe (1964) offered the insight that the value of a stock (or portfolio) is often heavily influenced by the returns of the wider stock market that the stock (portfolio) is from. Then, if the wider stock market is affected by oil shocks, and additionally the stock (portfolio) is affected by the market value, it follows that oil shocks are transmitted indirectly through the market risk. Rationalizing the dependence of the wider stock market upon oil is straightforward, since higher oil prices can be viewed as a signal of overall inflation in the economy and central banks therefore respond to such increases by raising the interest rate. Among other things, this can lead to a tighter monetary environment, which will negatively influence stock prices in all areas of the market. Taken together, these point toward the fact that often it should be easy to rationalize and quantify at least (i) some influence of oil shocks upon the value of the wider stock market and (ii) some dependence of the stock (portfolio) upon the value of the market (the traditional 'market beta'). Cumulatively, these define what we refer to here as the 'indirect' effect.

Whilst both channels of influence discussed above are broadly accepted within the literature, empirical studies looking at the returns of an individual stock (or portfolio) offer surprisingly limited discussion of them both at the same time, i.e. their cumulative effect.[1] This has resulted in what seems to be an overly disparate discourse as to whether or not oil shocks affect stock returns. The main aim of this paper therefore is to empirically emphasize the two channels of effect, both 'direct' and 'indirect'. Specifically, we specify a simple empirical asset pricing model for all (active) listed energy stock portfolios in the Asia Pacific Region, statistically testing for the influence of oil shocks using daily returns. Under the assumption that market returns influence the portfolio and not vice versa, the

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[1] One exception is Hammoudeh and Li (2004); however, in attempting to quantify this using weekly data from GCC stock markets the authors were unable to produce statistical evidence to support their conjectures.